ETIPS: Using Cases with Virtual Schools to Prepare for, Extend, and Deepen Preservice Teachers' Field Experiences

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Abstract

Field experiences are identified as an important component in the preparation of new teachers. As such, methods to supplement field experiences with pre and post activities that ready preservice teachers to effectively learn from them warrant further examination. This paper presents one tool that has been used successfully to improve preservice teachers' instructional decision-making knowledge about technology integration, with the unintended outcome of readying them for field experiences in general.

An important component in the preparation of new teachers is their field experiences (Griffin, 1986; McIntyre, Byrd & Foxx, 1996). Yet when learning experiences move beyond the college classroom's walls, the educational challenges increase, in part due to the complex and infinitely varying contexts in which the students are placed. For example, in preparing preservice teachers to integrate educational technology during field experiences, the hardware, software types and versions, operating systems, and Internet bandwidth levels might all be different than what students experienced in their own learning, and as a result reduce their ability or confidence to plan and implement technology-integrated instruction. Even if those contextual elements are familiar, students might face challenges in gaining access to the educational technology and support for it, or in understanding the locally acceptable uses of it for that school culture. Learning exercises designed to supplement preservice teachers' field experiences can add value by helping them to prepare for these varying contexts, and extend what they will notice and learn while in the field. This paper presents a set of online Web-based educational cases that have been used successfully to forge a connection between classroom and field experiences.

Examining student performance data from the ETIPS cases we found they increased preservice teachers' instructional decision-making knowledge about technology integration (Riedel & Scharber, 2003). Hierarchical linear modeling of the implementation data and student case performance data showed us there are instructor/class-level characteristics to students' case performances as well as to their ratings of the usefulness of the cases for learning about technology integration (Riedel, Scharber & Dexter, 2004). Controlled experiments testing ETIPS embedded assessment features established the efficacy of the software's automated essay scoring feature, and to a lesser degree its PlanMap feature, as a learning support to students (Riedel, Dexter, Scharber, & Doering, 2006). Here, we report on how faculty and students also found the virtual schools in these cases helpful for preparing for field experiences, both for their technology integration efforts while there and in general.

Literature Review

Aspects of the context of the field experiences are recognized as influential on how student teachers teach. Teacher educators have attended to contextual influences such as cooperating teachers' beliefs, instruction, and feedback (Borko & Mayfield, 1995; Bunting, 1988; Osunde, 1996); university supervisor's levels of feedback (Richardson-Koehler, 1988); whether the site provides an environment that support students' using what they have learned in university courses (Zeichner & Gore, 1990) or provides students with experiences with key populations—such as multicultural, urban, or special education students (McIntyre, Byrd, & Foxx, 1996); and if field experiences overall reflect key theoretical and conceptual components of the teacher preparation program (Guyton & McIntyre, 1990).

The ability for student teachers to be able to use educational technology in their field experience contexts is a concern for teacher education institutions as they examine how their programs of preparation provide opportunities for students to work toward the technology competencies. These competencies are inherent in the Interstate New Teacher Assessment and Support Consortium standards (INTASC, 1992), used by many states as licensing requirements, and the National Education Technology Standards for Teachers (ISTE, 2000), which were adopted by National Council for Accreditation of Teacher Education (NCATE, 2001) as a part of their accreditation requirements.

Although there is consensus in the educational technology field that preservice teachers should use technology during practicum and student teaching experiences, opportunities to do so do not happen often enough (CEO Forum, 1999, 2000; Moursund & Bielefeldt, 1999; Office of Technology Assessment, 1995; Walsh, Hagler, & Fowler, 2003). There are many difficulties inherent in providing such field-based practice opportunities where preservice teachers can observe as well as practice lessons involving technology integration (Wetzel, Zambo, & Buss, 2000). Resourceful models to address improving technology access at field sites have emerged including equipping classrooms as model sites (Wetzel, Zambo, & Padgett, 2001), allowing students to request placements in technology-rich sites (Strudler & Grove, 2002), and using video conferencing to extend the access to such classrooms (Beyerbach, Walsh, & Vanatta, 2001). Other research has focused on determining the technology attitudes of the cooperating teacher (Bosch & Cardinale, 1993) and the importance of mentor teachers who support lessons with technology (Grove, Strudler, & Odell, 2004).

In addition to access and support, setting expectations for students to use technology during field experiences and the level of instructional support they have for doing so also are significant predictors of how much they use technology in field experiences (Dexter & Riedel, 2003). This suggests that helping students to learn to adjust instruction to varying levels of technology access and strengthening their instructional decision making about technology will increase the likelihood of meeting such expectations.

Finally, Norton and Sprague note that "there is a need to explore alternatives" (p. 41, 2002) due to the difficulty of finding model field-ex-

perience environments and the dilemmas inherent in enhancing learning within traditional field experiences. One such alternative is the use of cases; many teacher educators promote instructional cases as unique and helpful tools for teacher preparation. Researchers suggest that when properly used, cases can help teachers practice how to think professionally about instructional problems, solutions, and alternatives (Lacey & Merseth, 1993; Merseth & Lacey, 1993; Elksnin, 1998, 2001; Manouchehri & Enderson, 2003; Masingila & Doerr, 2002). Similarly, multimedia cases provide a shared context for the exploration of pedagogical problems. Unlike linear cases, multimedia cases "come much closer…to mirroring the complexity of the problem space in which teachers work" (Putnam & Borko, 2000, p.8). Incorporating cases such as the ones described in this paper into the preparation of new teachers to learn to use technology for instructional purposes provides an opportunity to prepare for, extend, and potentially deepen preservice teachers', perhaps somewhat limited, field experiences with technology.

The ETIPS Case Learning Environment

ETIPS (Educational Theory into Practice Software) cases were designed to provide preservice teachers with practice opportunities to make instructional decisions about technology integration and implementation in virtual yet realistic school settings. Two key premises undergird the design of the technology integration case experiences:

- Decision making best characterizes the mental processes teachers engage in during lesson planning and teaching (Clark & Yinger, 1977; Lipham, 1974), and this is a process that can be taught and requires practice in order to learn (Marzano, 1992).
- Instructional decisions are guided by schemas, or mental models (Shavelson & Stern, 1981). By providing instructors with nine schools among which to choose to set these decision-making exercises, ETIPS allows instructors to give their students multiple practice opportunities to see how these principles can guide instructional decision making about technology integration and implementation in a variety of school contexts. These cases allow students studying to be teachers to practice making instructional decisions about educational technology use in classrooms and schools using the Educational Technology Integration and Implementation Principles (see Figure 1) as a schema, or the basis of a schema, for those decisions. A case's main topic is one of six principles that summarize what research suggests are the conditions that should be present in order for educational technology integration and implementation to be effective (Dexter, 2002). The first three educational technology principles focus on integration, meaning teachers' instructional decision-making process when considering the use of educational technology resources in their classrooms. Cases on these principles develop the premise that a teacher must act as an instructional designer and plan for the use of the technology to support student learning. The last three educational technology principles focus on the implementation of technology at the school level—that is, how a school setting can create a supportive context that provides teachers with the necessary access to technology, technical and instructional support, and a positive climate for professional collaboration about educational technology tools.

Overall, ETIPS cases are opportunities for students to practice reasoning with the guiding theory of the case's topic and to develop an understanding of how a specific school context in which the case is set might influence how that theory is applied in practice. By assigning multiple cases, each case in a different school, the instructor can give every student experiences with different settings, yet provide a common set of experiences for class discussion.

After logging in to access the case assignment the student's instructor created, the student reads a scenario set in a school in which she needs to imagine herself working and that requires her to make an instructional decision about technology integration or implementation; she then selects and looks through the school's information she thinks she will need in order to make that decision. Each user is provided with a challenge that outlines his/her role in the scenario and poses a set of questions to answer based on one of six Educational Technology Integration Principles (Dexter, 2002) selected by their instructor. An example of a case introduction based the second integration principle, technology adds value to teaching and learning, is provided below:

Classroom Integration Principles
1. Learning outcomes drive the selection of technology
2. Technology adds value to teaching and learning
3. Technology assists in the assessment of learning outcomes

School-wide Implementation Principles
4. Ready access to supported, managed technology is provided
5. Professional development targets successful technology integration
6. Professional community enhances technology integration and implementation

Figure 1: The educational technology integration and implementation principles, each of which can serve as the basis for a case.

> Imagine that you are midway through your first year as a seventh grade teacher at Cold Springs Middle School, in an urban location. A responsibility of all teachers is to differentiate their lessons and instruction in order to accommodate for the varying learning styles, abilities, and needs of students in their classrooms and to foster students' critical and creative thinking skills. As a new teacher at Cold Springs Middle School, you will be observed periodically throughout the first few years of your career. One of the focuses of these observations is to analyze how well your instructional approaches are accommodating students' needs. The principal, Dr. Kranz, was pleased with your first observation. For your next observation she challenged you to consider how technology can add value to your ability to meet the diverse needs of your learners, in the context of both your curriculum and the school's overall improvement efforts. She will look for your technology integration efforts during your next observation.
>
> On the case's answer page, you will be asked to address this challenge by making three responses:
>
> 1. Confirm the challenge: What is the central technology integration challenge in regard to student characteristics and needs present within your classroom?
> 2. Identify evidence to consider: What case information must be considered in a making a decision about using technology to meet your learners' diverse needs?
> 3. State your justified recommendation: What recommendation can you make for implementing a viable classroom option to address this challenge?

The cases' design utilizes a simulated school's Web site to provide a problem space where a user assumes the role of a teacher faced with a technology integration or implementation decision. In each simulated school Web site, users draw on 68 pieces of information which are listed under seven categories (i.e., About the School, Students, Staff, Curriculum and Instruction, Technology Infrastructure, School Community Connections, and Professional Development) to provide a written answer to the questions posed in the case. The ETIPS software tracks what information

the user seeks out, for how long, and in what order. This data is provided as feedback in graphical and numerical formats to the user and the instructor and supplements the student's essay response as a learning indicator. (See the project Web site, www.etips.info, for more information.)

Table 1: Description of Study Sample

Faculty Member	Course Type	Institution Type	Number in Panel	Mean Rating of ETIPS Case Usefulness1 (low) -5 (high)*	# Cases Discussed in Class / Cases Completed	Faculty Use of More Than 1 Assessment Feature?^
Fall 2002 Test-Bed Sites						
A1	Technology	Private Liberal Arts College	12	2.33	0/3	No
B1	Foundations	Private Liberal Arts College	11	1.27	1/3	No
C1	Methods	Public University	4	3.00	2/3	Yes
D1	Methods	Public University	3	2.33	3 / 4	No
E1	Foundation	Public University	26	2.85	2 / 4	No
F1	Foundation	Private Liberal Arts College	16	2.50	3 / 4	Yes
G1	Methods	Private Liberal Arts College	14	2.93	4 / 4	Yes
G2	Methods	Private Liberal Arts College	11	2.73	4 / 4	Yes
H1	Foundations	Public University	13	3.15	2 / 4	Yes
I1	Technology	Public University	16	3.19	0 / 3	No
J1	Foundations	Public University	12	1.83	2 / 3	Yes
Spring 2003 Test-Bed Sites						
A2	Technology	Private Liberal Arts College	13	1.92	1 / 3	No
C2	Methods	Public University	4	2.00	2 / 3	Yes
C3	Methods	Public University	7	3.86	4 / 4	Yes
H2	Foundations	Public University	25	2.80	3 / 3	Yes
I2	Technology	Public University	19	1.79	1 / 3	No
K1	Technology	Public University	15	2.87	1 / 3	No
L1	Technology	Public University	22	3.23	3 / 3	Yes

Usefulness Rating: Mean=2.63, s.d.=1.05, 1=Not at all useful, 2=A little useful, 3=Somewhat useful, 4=Useful, 5=Very useful. (^Assessment features include search path map, relevancy scores, and essay scores; use constitutes report by instructor that feature was used to support analysis and discussion of student performance.)

Methods and Data Sources

During the 2002–03 academic year qualitative and quantitative data were collected at 10 different teacher education institutions in which the ETIPS cases were assigned and completed by students in at least one teacher education course. The institutions were evenly divided between large public universities and small, private liberal arts colleges. The majority of programs followed a traditional curriculum order of foundations and methods course work followed by field experience during the students' last year; three sites had non-traditional education programs that attempted to integrate field experience throughout the licensure program. The sample included 18 different course sections taught by 12 different instructors (See Table 1).

The research employed a mixed-method strategy to examine test-bed sites' case implementation and the cases' effectiveness. Methods included interviews and surveys administered to test-bed faculty, surveys administered to participating students, on-site observation of actual implementation of the cases, and online tracking of faculty and student work with the cases. Analysis of the data emphasized "thick description" of implementation activities, derived from several qualitative data sources, in each of the course sections where the cases were implemented.

Following each semester of implementing the cases in one or more classes, each test-bed faculty member took part in an in-depth implementation interview by telephone. These interviews were recorded and transcribed. For this paper these transcripts were reviewed for all mentions of students' field experiences. This theme was then further broken down into the two categories based upon whether students had yet to go to or were in field experiences, as reported in the results section.

Members of the research team completed structured observations of implementation with nine test-bed faculty in fall 2002 and six test-bed faculty in spring 2003, for a total of 15 of 18 course sections. Additional data on implementation was provided through examination of faculty use of an online learning environment supporting the cases, instructor focus groups during a mid-year project meeting, and course syllabi.

Assessment of the effectiveness of the cases as tools for teaching technology integration was based on both qualitative and quantitative methods. Data on individual student's performance in ETIPS cases along with essays written in response to the challenge in the case introduction were available for analysis. In addition, students in each course section were asked to complete a questionnaire at the beginning and end of their course, which provided a self-assessed measure of educational technology integration skill. A total of 243 students completed both pre and post-course questionnaires.

Students' knowledge about using educational technology in teaching was assessed through the pre-and post-semester surveys. One assessment was with the Technology Proficiency Self-Assessment Scale (Knezek, Christianson, Miyashita & Ropp, 2000; Ropp, 1999) which asked respondents to rate their confidence, using a five point-scale, to perform 18 different technology-related tasks including three involving using technology in teaching: "Create a lesson or unit that incorporates subject-specific software as an integral part of the lesson or unit," "Describe 5 software programs that I would use in my teaching," and "Write a plan with a budget to buy technology for my classroom." These three items formed a reliable General Teaching with Technology Scale (alpha = .80 for pre-semester measure).

An additional assessment used to measure student knowledge in using technology in teaching was through student ratings of 21 tasks, aligned to the ISTE/NETS-T standards, with which students were asked to rate their preparedness using a four-point scale to complete each of the tasks. Based on a factor analysis with fall 2002 responses, three separate scales were constructed using 15 of these items. These include a Planning with Educational Technology Scale (6 items, alpha = .91 for pre-semester measures); an Individualizing Instruction with Educational Technology Scale (4 items, alpha = .91 for pre-semester measures); and a Managing Educational Technology Scale (5 items, alpha = .92 for pre-semester measures). Question wording and scale descriptives are located in Appendix A.

The post-course questionnaire also asked students to rate the general usefulness of the ETIPS case (on a scale from 1 (low) to 5 (high) and describe in an open-ended format what they found most useful about using the cases (see Appendix A for question wording). The co-authors independently coded this question with a set of 11 codes. We achieved an exact agreement rate of 90.1 percent (n=281 / 312). Disagreements were settled by consensus. The categories were further combined for presentation.

Findings

Data on the effectiveness of the cases to teach students about technology integration and the variation of the implementation activities have been reported in more detail elsewhere (Riedel & Scharber, 2003; Riedel, Scharber, & Dexter, 2004). We will recap them briefly here in order to explain the context for the results we go on to report in detail, which is how data on the implementation of the cases revealed the unexpected outcome that the cases provide learner benefits that enhance field experiences in general.

Cases Increase Students' Technology Integration Knowledge

Technology integration knowledge gains as measured by the pre- and post-surveys are illustrated in Table 2. While students in all five technology course sections made gains in self-assessed technology skill, so did 11 of the 13 other (methods and foundation) course sections. The gains in the technology course sections (i.e., those taught by instructors A, I, K, L) are not terribly surprising, given that the scales on the survey measured items similar to the core purpose of the technology classes. However, in the other 11 course sections, the gains in self-assessed technology skill most likely came from the case experiences. While our outcome measure used a self-assessment technique instead of a direct measure (e.g., observation) of technology integration, these findings suggest that the cases are effective at their central purpose, which is to develop students' technology knowledge. Additional analyses suggest that the magnitudes of these gains are partially dependent on classroom implementation (Riedel, Scharber, & Dexter, 2004) and the initial technology skills of students using the cases (Riedel & Scharber, 2003).

Table 2: Levels of Self-Assessed Skill with Instructional Technology by Course Section

Test-Bed Sites	General Teaching with Technology Scale		Planning Technology Integration Scale		Individualizing Instruction with Technology Scale		Managing Technology Scale	
	Initial	Gain	Initial	Gain	Initial	Gain	Initial	Gain
Fall 2002								
A1	8.08	2.08	11.75	***4.42	6.17	*1.92	9.50	***3.08
B1	9.09	**2.18	16.27	0.45	10.45	0.36	12.36	1.55
C1	10.50	1.00	18.75	*1.75	9.25	0.75	16.50	1.00
D1	11.67	0.33	17.33	3.67	12.33	3.33	13.67	3.00
E1	7.27	***2.12	14.19	**3.15	7.35	**2.27	10.96	**2.46
F1	9.44	0.25	15.63	1.63	9.75	1.31	12.44	1.44
G1	10.43	**2.00	19.29	-0.50	10.36	0.93	14.86	1.57
G2	10.73	1.45	18.00	1.55	10.00	*2.45	15.73	2.36
H1	10.23	1.31	16.15	**2.77	8.46	***3.23	12.92	***2.92
I1	8.81	***3.69	15.50	**4.63	7.81	***4.94	11.56	***5.25
J1	8.17	*1.50	13.17	3.25	6.42	1.83	10.50	2.17
Spring 2003								
A2	8.69	**3.00	16.69	*3.92	9.00	*3.00	13.23	**2.77
C2	12.00	**2.50	17.50	*4.75	9.25	*4.50	14.50	3.75
C3	8.86	1.86	13.29	***5.86	7.86	*2.71	10.14	**3.57
H2	9.60	***2.36	15.08	***4.00	8.76	***3.08	12.28	***3.16
I2	7.47	***4.53	13.26	***7.05	7.79	***5.10	9.84	***6.26
K1	8.00	***3.80	13.33	***5.93	6.80	***4.67	11.13	**3.60
L1	6.68	***5.14	12.32	***7.50	7.05	***5.45	9.95	***5.73

****p* < .05, ** *p* < .01, *** *p* < .001 based on paired t-test.**

General Teaching with Technology Scale: range=3 (low) – 15 (high), mean=8.7, s.d.=3.7.

Planning Technology Integration Scale: range=6 (low) -30 (high), mean=14.9, s.d.=4.3

Individual Instruction with Technology Scale: range=4 (low) – 20 (high), mean=8.2, s.d.=3.1

Managing Technology Scale: range=5 (low) – 25 (high), mean=11.9, s.d.=3.9

In studying the implementation data of how instructors adapted and extended their uses of the cases and the students' open-ended responses about why they found the cases useful, some more general, and unexpected, patterns emerged about how faculty and students alike found the cases useful in readying students for field experiences and in helping students already involved in field experiences to understand more about those settings.

Cases Ready Students for Field Experiences

In many of the courses of test-bed faculty where students had not yet had field experiences, the school setting portrayed in the cases provided a common learning experience from which to launch discussions of the school as a workplace for teachers and the professional considerations in it. We reason that by broadening students' understandings of schools, the cases prepare students to more fully recognize important aspects of schools when they do go out to their field placement sites.

Instructor L, from a mid-sized public university, used the cases in a foundations class and said she viewed the cases two ways. One way was as a "virtual environment of the school that is somewhat of a playground for people to go in and look around without actually leaving the building. The second [way] is the focus in the course in trying to help people understand schooling as an institution." Other test-bed members reported that it was the way the schools in the cases portrayed that there was, for example, such things as a technology director, technology committee, and acceptable use policies. As one faculty member put it, seeing these concepts illustrated in a school context "aided them to better understand the structure within a school system." Another added that she "felt like they did get sort of a peek into issues relating to schools" and a third concluded that "I think that they gained familiarity with how "real schools work." For the majority of the test-bed faculty, an added value of the cases was that they provided a scaffold for discussions of "real schools," although this aid was one that was not anticipated by the project staff members. However, Instructor F, at a private liberal arts college, described how that from the initial training she set the goal of making the cases work as scaffold to the students' improved understanding of how schools might differ from one another:

> Based on our experiences when the test-bed faculty went through the experience, I thought that it might provide them [students] with a pretty thorough overview of a typical school, and so they got to look at things well beyond just physical education that would be very typical in schools at different levels. So that was goal number one.

In addition to illustrating the structures and components of school systems, test-bed faculty members found ways that the cases helped them highlight to their students the interactions among the professionals at

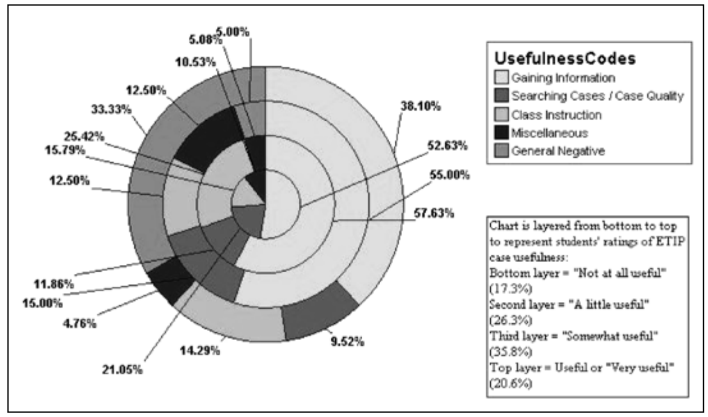

Figure 2: Open-ended student descriptions of most helpful aspects of how cases were used in class, organized by rating of case usefulness. (n=158 coded open-ended responses)

the school, and to also see the school as a system. Instructor G, teaching education foundations classes in a small liberal arts college, took the opportunity to emphasize the overall course topic of how professionals in a school can work together as a community:

> I really wanted them to think about the relationships between people and really to focus on who were the players in the schools, how those players could support each other, and what were the resources that were there…. I think they got out of it an appreciation for the diversity of schools and that no matter where you are, you can develop a learning community that will enhance the success of the kids and yourself…. you can use the resources that are there, and you can start to think more systemically, rather than to just think that there is only one way to do this because this is all they've got.

For Instructor K, who taught technology courses at a large public university, the value of how the cases illustrated school decision-making processes was shown to him when he asked his students, a mixture of graduate and undergraduate students, their opinion of the cases. He said that the undergraduate students' responses showed how their insights were about more basic issues, as compared to the graduate students:

> I just asked comments from them about the cases and what they saw, and I got some different answers, I guess, from the teachers who are taking it for grad credit, because they understand that far better. They understand the school structure, limited budgets, and the fact that you don't just buy software and put it on your machines. You have to make a proposal and go through the bureaucracy of it going to the committee, and approval, the director and superintendent and all that kind of stuff. They understand standards and they understand the business of social-economic and free and reduced lunch, which your undergraduates, that's a big stretch for them.... A lot of them [the undergraduates] just thought that if I had a computer, I could get whatever software I wanted and use it however I wanted to. They got to then see that, yes, there are issues, there are standards, there are particular attributes of the school, whether it's testing or social-economic or free and reduced lunch, that a lot of students that are maybe on IEPs that really, you're going to have to treat them all differently. For your undergraduates, that a huge leap…. They haven't done any student teaching. The only experience they've had with schools is probably going through a school system themselves to graduate from high school. They're not aware of all those things that necessarily are online here.

Instructor A, at a small private college teaching technology courses, drew the conclusion that ETIPS cases are "an online tool for helping students learn about schools." Based upon that strength, she then recommended that cases should be created that extend beyond technology topics. This recognition of how cases could extend beyond their original technology focus came from another faculty member as well, who described first how the insights the students were gaining of schools were very exciting for her:

> I think she just really liked getting to understand school in different ways. To really see schools in different ways. I don't think my students really saw it as a technology thing. They saw it as a way to start to understand school. Technology just was a piece of it. It wasn't the most important piece to them. (Instructor G)

These data suggest that the cases oftentimes provided preservice teachers with ideas and information about school settings in general, and provided a structured learning experience for faculty to introduce more general aspects of schools.

The faculty members' conclusions were echoed in the comments from the students when asked the open-ended question, "What were the most helpful aspects of how the cases were used in the class?" Figure 2 presents students' categorized responses to this question, broken out by how helpful they rated the cases to be. At all levels of ratings of usefulness, the most frequent reason given was that from the cases the students gained information, and the more helpful the student rated the cases to be, the greater the proportion of responses referring to "gaining information" as the reason why. The "gaining information" category contains all responses that referenced general exposure to information about schools, as well as more specific references to learning about curriculum, assessment, and technology.

For example, some students were more general and jotted comments that the cases "gave me ideas" and "got me thinking." Another student indicated that the cases helped because it was "good to see different ideas/options" and yet another said the cases allowed users "to see what the future can be like." Some comments about the nature of the information gained were more specific. Because there were nine different schools in which the cases could be set and many instructors used two to three of these settings in their assignments, students wrote that they learned of the "demographic reality of public school" and that they got to see "different areas/rural-suburban." One student concluded that this "made a person think about diverse backgrounds."

No matter what the school's setting for the case, the majority of comments within the gaining information category referenced specific sorts of information they gained, with the majority of comments being about technology hardware and software, and then curriculum and assessment. Typical responses from a number of students include, "learning how to use technology in the classroom," "getting ideas of how to integrate technology," and "the different aspects of tech." A lesser number of students found that the cases' information about "standards by content area," "ideas for lesson plans," and information on assessment practices were helpful.

Cases Aid Students Making Connections to Current Field Placements

Four of the 13 faculty members indicated that for students who were already out working in field placement sites doing the cases for class at the same time provided a common frame of reference to discuss with

them the structure and components of schools where they were currently visiting.

Instructor G asked students to compare the simulated schools in the case with their current fieldwork assignments and how their tasks in the cases compared with problems they might have encountered as student teachers. The cases served as a way to teach her students about the organization and processes of schools, so she could then draw attention to similar elements in the students' field placement sites. She explained,

> I used their placement sites to really draw them into the conversations about, you know, "What do you see in your placement site?" If I were going to ask you to create professional development plans…. [the topic of the case she had students do] what changes might you make to it if you wanted to answer this particular [case] question in the school that you are at?"

This same instructor reported a student told her, "I really liked doing it [the cases] and being out in the school at the same time, because I could really kind of look at my school through a different lens."

Instructor E, teaching a course on assessment at a smaller public university, described how she used the students' familiarity with the design and content of the ETIPS cases' Web sites to scaffold students' learning to look for student performance data on the state department of education's and their own school's Web site:

> One connection I was thinking as we do the cases is have them compare their home district's Web site with what we are doing in ETIPS … and then that [information] can help support them as they make decisions about what they need to be teaching the kids, and how they can use this data in the assessment positions. Since we had gone with [state department of education's] Web site, and students knew that district assessment information really was out there and available, I tried to make a connection there too.

Instructor B, teaching foundations of education classes at a small private women's college, recalled how after the students had completed the cases and then had been in their field placement sites for a while, a class discussion came back to the core topic of the cases she had selected, which was the implementation principle about ready access to supported, managed, technology. Instructor B said how the case topic had helped at least one student look more analytically at the situation she had found in her placement site, and that she hoped others would learn to think in those terms too. Instructor B describes how a student had a technology-based curriculum available to use at her site, without adequate levels of access on which to use it:

> We talked about some of the technology they were seeing in their schools and the challenges and some of the positive things that had happened. For instance, Chris had shared where she was at a particular middle school where they had the Jason Series of Curriculum, but yet no technology to implement it, and it was a technology-based curriculum…. And I am kind of hoping that in a round-about way … that if they get into a situation like Kristen was in this particular middle school, that they would know how to advocate for technology, or know what kinds of questions they need to ask. Like, "What types of supports do you have for using a technology based curriculum?" And if it is a computer lab with 20 desktop computers and it is scheduled all the time, then why would we purchase this curriculum?

Conclusion and Implications

Beyond helping preservice teachers learn about integrating technology into classrooms, the central purpose of the cases, these data suggest that the cases oftentimes provided students with ideas and information about school settings in general, thereby preparing them for, extending, and deepening their field experiences. Students prepared for field experiences by gaining some additional, practical information about schools that let them take on a more advanced posture in their field experience; for example, they learned about the sort of assessment data they should look for in their field placement site. Students' experiences were extended beyond the range of what they encountered through their field placements through the virtual schools they encountered, which allowed them to consider how their decisions would be different in a different school context. Finally, students' reflections on the field experiences were deepened through the cases by how they learned to see multiple levels of the school beyond their immediate classrooms. Faculty members, too, found ways they could connect the example schools portrayed in the cases to field experiences in general, as well as how the cases' virtual schools illustrated other topics under study in their courses. This suggests that virtual schools, such as those in the ETIPS cases or others that might be created in future games and simulations, could serve as a scaffold to help preservice teachers learn the most they can from field experiences. That is, if the cases can be positioned pedagogically so they serve in a role so as to supplement field experiences.

While the test-bed members valued the cases in part because of the way the schools portrayed in them were realistic, an implication is that such learning experiences have to be designed carefully because they do teach preservice teachers what to notice and look for, and influence what they consider the appropriate information to consider, processes of analysis to apply, and decisions to make. Through influencing users' schema about what schools are like as workplaces, cases can reinforce either traditional or progressive notions of professional community, leadership, and teaching and learning. Because the ETIPS cases were designed to develop the schema of novices, our development process took that responsibility seriously. For example, the nine schools available in which to set an ETIPS case are laid out using a common information structure, but their specific school descriptions vary considerably. Thus with a careful selection of school settings in assignments and guided discussions a wide range of work conditions could be emphasized. Even so, there is a limit to the range of possibilities represented in these nine settings and developers should be aware of what they are teaching implicitly, as well as explicitly.

Despite this caution, as the materials discussed here demonstrate, there is promising potential for using virtual learning environments to supplement and make all the more effective the limited field experiences with technology that are available to preservice teachers. Thus, the teacher educator field should respond with a greater number of designs for virtual learning environments, corresponding research on their effectiveness, and the further refinement of the case methods of instruction that will help our preservice teachers learn the most they can from them.

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Appendix A: Survey Question Wording

General Educational Technology Skill Scale Items

I feel confident that I could . . .

(1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree)

a. Create a lesson or unit that incorporates subject-specific software as an integral part of the lesson or unit.
b. Describe 5 software programs that I would use in my teaching.
c. Write a plan with a budget to buy technology for my classroom.

Planning with Educational Technology Scale Items

The statements below refer to different tasks you might do as a teacher. Please check the box that indicates how prepared you feel currently to do each. (1 = Not prepared, 2 = A little prepared, 3 = Somewhat prepared, 4 = Well prepared)

a. Consider technology when designing lessons or units.
b. Use research related to effective use of learning technology when planning lessons or structuring classroom environments.
c. Evaluate a range of educational technologies on their appropriateness for particular classroom uses.
d. Locate and access educational technology resources.
e. Plan developmentally appropriate classroom instruction and student activities that utilize technology.
f. Use technology to develop students' higher order thinking skills and creativity.

Individualizing Instruction with Technology Scale Items

The statements below refer to different tasks you might do as a teacher. Please check the box that indicates how prepared you feel currently to do each. (1 = Not prepared, 2 = A little prepared, 3 = Somewhat prepared, 4 = Well prepared)

a. Use technology to meet the needs of special needs students.
b. Use technology to assess student learning.
c. Individualize technology use for students with diverse needs or abilities.
d. Draw on strategies for using technology to individualize instruction, including meeting the needs of special populations.

Managing Educational Technology Scale Items

The statements below refer to different tasks you might do as a teacher. Please check the box that indicates how prepared you feel currently to do each. (1 = Not prepared, 2 = A little prepared, 3 = Somewhat prepared, 4 = Well prepared)

a. Judge whether you or your students have appropriate access to technology to use a particular lesson.
b. Judge whether technical support in a school is sufficient to use technology in a particular lesson.
c. Monitor and manage what students learn in technology rich learning environments.
d. Coordinate available technology and classroom schedules when planning to integrate technology in a lesson.
e. Collaborate with other teachers in planning for technology integration in a classroom or school.

Rating the Usefulness of ETIPS Cases

To what extent were the ETIPS cases useful or not useful in learning about technology use in education?

(1 = Not at all useful, 2 = A little useful, 3 = Somewhat useful, 4 = Useful, 5 = Very useful)